

Australian/New Zealand Standard™

**Performance of household electrical
appliances—Dishwashers**

**Part 2: Energy efficiency labelling
requirements**



AS/NZS 2007.2:2005

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Business New Zealand
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Department of Energy, Utilities and Sustainability (NSW)
Department of Industrial Relations (Qld)
Electrical Compliance Testing Association
Energy Efficiency and Conservation Authority of New Zealand
Institution of Professional Engineers New Zealand
National Appliance and Equipment Energy Efficiency Committee
National Association of Testing Authorities Australia
Office of the Chief Electrical Inspector
Office of the Technical Regulator (SA)

Australian/New Zealand Standard™

Performance of household electrical appliances—Dishwashers

Part 2: Energy efficiency labelling requirements

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-015, Quality and Performance of Household Electrical Appliances, to supersede AS/NZS 2007.2:2003 on publication.

The AS/NZS 2007 series is comprised of two Parts, as follows:

AS/NZS	
2007	Performance of household electrical appliances—Dishwashers
2007.1	Part 1: Methods for measuring performance, energy and water consumption
2007.2	Part 2: Energy efficiency labelling requirements (this Standard)

The overall objective of the AS/NZS 2007 series of Standards is to promote high levels of performance, energy efficiency and water efficiency in electric dishwashers.

The Parts of AS/NZS 2007 are summarized as follows:

- (a) *Part 1* Includes performance test procedures and minimum performance criteria for dishwashers.
- (b) *Part 2* Includes algorithms for the calculation of the energy efficiency star rating and comparative energy consumption, performance requirements, details of the energy efficiency label and requirements for the valid application for registration for energy efficiency labelling. It also includes the application form for registration for water efficiency labelling. It has been structured to be suitable for reference in regulatory legislation and to be used in conjunction with Part 1.

The main changes in this Standard are as follows:

- (i) Introduction of a new application form and procedures for registration for water efficiency labelling.
- (ii) Inclusion of standby power into the energy efficiency label calculations.
- (iii) Introduction of a requirement to enable a regulator to be able to determine the date of manufacture from information marked on the appliance.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

Regulatory authorities have advised that registrations which rely on test reports to AS/NZS 2007.1:2003 or where products are registered to the requirements of AS/NZS 2007.2:2003 will expire on 31 March 2007. All products imported or manufactured after 31 March 2007 will require a registration and an energy label in accordance with this Standard.

Administrative arrangements during the transition period may vary so registration holders should contact their regulator to obtain detailed requirements with respect to labelling and registration requirements (refer also to Section 4 of this Standard).

Check testing, where applicable, will be undertaken to the version of the test Standard that has been used to support the current energy label for that model.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard

Performance of household electrical appliances—Dishwashers

Part 2: Energy efficiency labelling requirements

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies the energy efficiency labelling requirements for electric **dishwashers** intended for household and similar use. This Standard does not specify safety requirements.

In particular, this Standard specifies the following:

- (a) **Program for energy efficiency labelling** and water efficiency labelling.
- (b) Water connection mode.
- (c) **Comparative energy consumption (CEC)**.
- (d) **Star rating** for energy efficiency labelling.
- (e) Requirements for energy efficiency label validity.
- (f) Performance criteria for energy efficiency labelling.
- (g) Printing requirements for **dishwasher** energy efficiency labels.
- (h) Format for the application for registration for energy efficiency labelling and water efficiency labelling.

1.2 APPLICATION

This Standard **shall** be read in conjunction with AS/NZS 2007.1:2005.

1.3 OBJECTIVE

The objective of this Standard is to define performance and energy efficiency labelling requirements that a **dishwasher** has to meet in order to carry a valid energy efficiency label.

1.4 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
2706	Numerical values—Rounding and interpretation of limiting values
AS/NZS	
2007	Performance of household electrical appliances—Dishwashers
2007.1:2005	Part 1: Methods for measuring the performance, energy and water consumption
2007.2:2003	Part 2: Energy labelling requirements
6400	Water efficient products—Rating and labelling
62301	Household electrical appliances—Measurement of standby power

1.5 DEFINITIONS

For the purposes of this Standard, the definitions given in AS/NZS 2007.1:2005 and those below apply.

NOTE: The defined terms have been bolded throughout this Standard.

1.5.1 Base energy consumption (BEC)

The nominal energy consumption of a **dishwasher** of a given **rated capacity** with an **SRI** of 1.00. (Refer also to Clause 2.5.) (Units: kilowatt-hours/year.)

1.5.2 Check test

A full or part test in accordance with the relevant Standard to verify the performance or energy consumption, or both, of an individual brand and model bearing an energy efficiency label.

1.5.3 Comparative energy consumption (CEC)

The nominal energy consumption of a model of **dishwasher** when connected to the **primary water connection mode**. It is based on the **PAEC_{av}** estimated for the model. (See also Clause 2.4.) The **CEC** appears on the energy label. (Units: kilowatt-hours/year.)

1.5.4 Family of models

A range of models of the one brand, for which a single set of test reports is applicable and where each of the models has the same relevant physical characteristics, **comparative energy consumption**, **star rating index** and performance characteristics. The term ‘model’ is synonymous with ‘family of models’.

1.5.5 Primary water connection mode

The **primary water connection mode** is used to determine the **CEC**, **SRI** and **star rating** for a **dishwasher**. The **primary water connection mode** is single cold connection, except where the manufacturer recommends hot connection only for the **dishwasher**.

1.5.6 Program for energy efficiency labelling

The **program** to be used for energy efficiency labelling is the **program**, including all associated specific settings, nominated by the supplier that is recommended to wash a normally soiled load at rated capacity and which meets the performance criteria specified in Section 3. (Refer also to Clause 2.2.1.)

1.5.7 Projected annual energy consumption (PAEC)

The estimate of energy used by a model or single unit during one year’s use when connected to the **primary water connection mode**. It assumes a particular number of uses in one year and includes the standby power for the remainder of the year. (See also Clause 2.3.) The **supplementary PAEC** is determined for the **dishwasher** using the **supplementary water connection mode**. (Units: kilowatt-hours/year.)

1.5.8 Star rating

The number of stars displayed on the energy efficiency label. Available stars are between a minimum of one and a maximum of six, shown in half star intervals. The **star rating** is calculated from the **star rating index**. (See also Clause 2.7.) (Dimensionless.)

1.5.9 Star rating index (SRI)

An indication of the claimed energy efficiency of a model. A higher **SRI** indicates higher energy efficiency. It is derived from the **CEC**. (See also Clause 2.6.) (Dimensionless.)

1.5.10 Supplementary energy consumption (SEC)

The nominal energy consumption of a model of **dishwasher** when connected to the **supplementary water connection mode**. It is based on the **supplementary PAEC** estimated for the model. Where applicable, the **supplementary energy consumption** appears on the energy efficiency label. (Units: kilowatt-hours/year.)

1.5.11 Supplementary water connection mode

The water connection mode that is allowable in addition to the **primary water connection mode**, according to manufacturer's instructions, and is used to determine the **supplementary energy consumption**. For **dishwashers** with two water inlets, the **supplementary water connection mode** is dual connection (hot and cold). For **dishwashers** with only a single water inlet, the **supplementary water connection mode** is single hot connection, where the manufacturer recommends/allows this as an alternative.

1.5.12 Variant

A model **variant** is an alternative version of a model, which has the same sales specifications and the same model number or other form of designation as another version of the model, and offers the same performance except that it has a different **PAEC_{av}**, and may have a different **SRI**. (Refer also to Clause 2.4.2.)

1.6 MEASURED QUANTITIES

Quantities used in this Standard **shall** be measured during tests carried out in accordance with AS/NZS 2007.1:2005.

1.7 ROUNDING

Unless otherwise stated, numbers shall be rounded and recorded to five significant figures in accordance with AS 2706.

SECTION 2 TEST REQUIREMENTS, CALCULATIONS AND ALGORITHMS FOR THE ENERGY EFFICIENCY LABEL

2.1 GENERAL

This Section sets out the test requirements, equations and procedures for calculating values of the **CEC**, and the **star rating**, which appear on an energy efficiency label.

The process consists of measuring the **tested energy consumption** (E_t) and standby power of each unit tested, then calculating the **projected annual energy consumption** (PAEC) of the unit. The values of PAEC for the units tested are used to calculate the **comparative energy consumption** (CEC) for the model. The CEC and the **rated capacity** are then used to calculate the **star rating index** (SRI) and the **star rating**.

CEC, SRI and **star rating** are determined using the **primary water connection mode** for the **dishwasher** (generally single cold connection).

NOTE: For a complete example of calculations carried out on a typical set of test results, refer to Appendix A.

Where the manufacturer allows or recommends any water connection mode in addition to the **primary water connection mode**, this **shall** be the **supplementary water connection mode** (See Clause 1.5.13.) In this case it is necessary to also test the **dishwasher** in this mode to determine the **supplementary energy consumption**. It is not necessary to determine performance, SRI or **star rating** for the **supplementary water connection mode**, however a soiled load **shall** be used for this test. Where no alternative water connection mode is allowed in addition to the **primary water connection mode**, **supplementary energy consumption** **shall** not be included on the energy label. (See also Clause 5.4.)

2.2 TEST REQUIREMENTS AND PROCESSING OF DATA

2.2.1 Program for energy efficiency labelling

The supplier **shall** nominate the **program for energy efficiency labelling**. This **shall** be the **program** recommended in the product literature i.e. operating manual or user instructions, to wash a normally soiled load at **rated capacity**. This **program** **shall** meet the performance requirements of Section 3.

If there is a **program** named 'Normal' in the product literature and/or marked on the **dishwasher**, or one that implies normal such as 'Universal' or 'Regular', then that **program** **shall** be the one nominated as the **program** for washing a normally soiled load.

If there is more than one **program** recommended to wash a normally soiled load at **rated capacity** e.g. 'Normal', 'Normal eco' and/or 'Normal plus', then the washing index performance criteria of Section 3 **shall** be met by each of these **programs**.

2.2.2 Number of units required

For the purpose of determining the CEC of a model for labelling, three separate units of the nominated model **shall** be tested for energy consumption and standby power in accordance with Section 2 of AS/NZS 2007.1:2005. At the supplier's discretion, more than three units may be tested.

2.2.3 Number of tests per unit

Each unit **shall** be subjected to at least one valid test run to obtain values of E_t and standby power for that unit. This determination **shall** be documented in a test report. (Refer Appendices D and K of AS/NZS 2007.1:2005.)

2.2.4 Multiple test runs

Where more than one test run is performed on a unit, the value of E_t **shall** be recorded for each run. For subsequent calculations, the values of E_t **shall** be averaged and treated as the result for that unit.

2.2.5 Results

After testing three or more separate units in accordance with Clause 2.2.2, the separate values of **PAEC** **shall** be averaged and referred to as $PAEC_{av}$.

2.3 PROJECTED ANNUAL ENERGY CONSUMPTION (PAEC)

The **PAEC** of a single **dishwasher** **shall** be given by the following equation:

$$PAEC = E_t \times 365 + [P_s \times (8.76 - T_c \times 0.365)] \quad (\text{kWh/year}) \quad \dots 2(1)$$

where

E_t = **tested energy consumption** expressed in kilowatt-hours in accordance with AS/NZS 2007.1:2005 (includes post program operation up to the end of the **cycle**)

P_s = the average measured standby power, in Watts which is the average of end of **cycle** mode and off mode, (where this mode is present) where these have been determined in accordance with AS/NZS 2007.1:2005

T_c = the **cycle time** (hours)

when tested under the following conditions:

- On the **program for energy efficiency labelling**.
- With a soiled load in accordance with AS/NZS 2007.1:2005.
- At the claimed **rated capacity** of the **dishwasher** in accordance with AS/NZS 2007.1:2005.
- Where the value of E_t has been determined using the **primary water connection mode** for the **dishwasher**.

Where the **dishwasher** has a **supplementary water connection mode**, the **supplementary PAEC** is also given by Equation 2(1), except that the value of E_t used is that determined for the **supplementary water connection mode** with a soiled load.

NOTE: It is not necessary to determine the washing and drying performance for the **supplementary water connection mode**.

2.4 COMPARATIVE ENERGY CONSUMPTION (CEC)

2.4.1 General

The **Comparative Energy Consumption (CEC)** for a model **shall** be an integer in units of kilowatt-hour/year. It **shall** not be less than the $PAEC_{av}$ which is the average energy consumption for the three (or more) units that are tested to determine the label particulars in accordance with Clause 2.3 (in kWh.)

2.4.2 Variant

Two or more **variants** of a model may use a common label with a **CEC** not less than the highest $PAEC_{av}$ (rounded to the nearest kWh) of those **variants**.

2.4.3 Supplementary water connection energy consumption

Where the **dishwasher** has a **supplementary water connection mode**, the **supplementary energy consumption** for a model **shall** not be less than the average (rounded to a whole integer) of the **supplementary PAEC** values for the three (or more) units which are tested to determine the label particulars. It is rounded to the nearest whole kilowatt-hour/year.

2.5 BASE ENERGY CONSUMPTION (BEC)

The **base energy consumption** for a **dishwasher** model **shall** be calculated from the following equation:

$$BEC = 48 \times RC \qquad \dots 2(2)$$

where

RC = the **rated capacity** (i.e. number of **place settings**) claimed by the manufacturer.

The **BEC shall** be rounded to the nearest whole kilowatt-hour/year.

NOTE: The value of 48 is a value based on market analysis.

2.6 STAR RATING INDEX (SRI)

The **SRI shall** be calculated by the following equation:

$$SRI = 1 + \left[\frac{\log_e \left(\frac{CEC}{BEC} \right)}{\log_e (1 - 0.30)} \right] \qquad \dots 2(3)$$

NOTES:

- 1 **SRI** is dimensionless.
- 2 The value of 0.30 equates to an energy reduction of 30% per additional star.

2.7 STAR RATING

The **star rating shall** be in accordance with Table 2.1.

NOTE: For a complete example of calculations carried out on a typical set of test results, refer to Appendix A.

TABLE 2.1
DERIVATION OF STAR RATING

Star rating index(SRI)	Star rating
$SRI < 1.5$	1.0
$1.5 \leq SRI < 2.0$	1.5
$2.0 \leq SRI < 2.5$	2.0
$2.5 \leq SRI < 3.0$	2.5
$3.0 \leq SRI < 3.5$	3.0
$3.5 \leq SRI < 4.0$	3.5
$4.0 \leq SRI < 4.5$	4.0
$4.5 \leq SRI < 5.0$	4.5
$5.0 \leq SRI < 5.5$	5.0
$5.5 \leq SRI < 6.0$	5.5
$6.0 \leq SRI$	6.0

2.8 ENERGY EFFICIENCY LABEL VALIDITY

The **CEC** value **shall** be accepted as valid if, when a single sample of a labelled model is subjected to a **check test**, its **PAEC** is such that—

$$PAEC \leq 1.1 \times CEC \qquad \dots 2(4)$$

If this is not the case, the **CEC** will be accepted as valid if three additional units are tested and the average **PAEC** of these additional units is such that—

$$PAEC_{av} \leq 1.1 \times CEC \qquad \dots 2(5)$$

These limits apply to energy consumption for both **primary water connection mode** and **supplementary water connection mode**.

More information on check testing procedures and requirements can be found in the Administrative Guidelines. The latest edition can be obtained from www.energyrating.gov.au website.

SECTION 3 PERFORMANCE CRITERIA

3.1 GENERAL

The performance criteria set out in Clauses 3.2 to 3.5 **shall** be met by each individual unit tested on the **program for energy efficiency labelling**, for the **dishwasher** model to comply with energy efficiency labelling requirements.

3.2 RATED CAPACITY

The **dishwasher shall** meet the requirements for **rated capacity** set out in Section 4 of AS/NZS 2007.1:2005.

3.3 WASHING INDEX

The **dishwasher shall** meet the requirements for washing index set out in Section 4 of AS/NZS 2007.1:2005 when connected to the **primary water connection mode**.

3.4 WATER CONSUMPTION

The **dishwasher shall** meet the requirements for water consumption set out in Section 4 of AS/NZS 2007.1:2005 when connected to the **primary water connection mode** and, if applicable, **supplementary water connection modes**.

3.5 DRYING INDEX

The **dishwasher shall** meet the requirements for drying index set out in Section 4 of AS/NZS 2007.1:2005 when connected to the **primary water connection mode**.

SECTION 4 APPLICATION AND TEST REPORT FORMATS

4.1 APPLICATION FOR REGISTRATION

4.1.1 General

Where the relevant regulatory authority requires registration or approval of energy efficiency labels, Clause 4.1.2 to 4.1.4 **shall** apply.

NOTE: At the date of publication of this Standard, the requirements of Clause 4.1.1 are applicable in Australia.

4.1.2 Registration

An application for registration of the **dishwasher** brand and model, in the format shown in Appendix C of this Standard, **shall** be submitted.

NOTE: Applications in the form of computer printouts, which present all the application data in a similar layout to the forms in Appendix C, are equally valid.

To register, contact the relevant state regulatory authority.

NOTE: Details of the relevant regulatory bodies, regulations and electronic copies of application for registration forms, as well as online registrations, are available at www.energyrating.gov.au website.

4.1.3 Test report format

A test report in the form of Appendix K of AS/NZS 2007.1:2005 for each model tested **should** accompany the energy efficiency labelling application.

4.1.4 Transitional period

From the date of publication of this Standard to 31 March 2007, it is anticipated that regulatory authorities will register **dishwashers** in accordance with either AS/NZS 2007.2:2003 or this Standard.

Regulatory authorities have advised that from 31 March 2007, it is expected that all new registrations or changes to existing registrations submitted in Australia and new records or changes to existing records kept in New Zealand, will need to meet the requirements of this Standard.

Regulatory authorities have advised that registrations which rely on test reports to AS/NZS 2007.1:2003 or where products are registered to the requirements of AS/NZS 2007.2:2003 will expire on 31 March 2007. All products imported or manufactured after 31 March 2007 will require a registration and an energy label in accordance with this Standard. Refer to Administrative Guidelines which are available from www.energyrating.gov.au for further information.

4.1.5 Links to water efficiency rating registration

Regulatory authorities have advised that registrations to AS/NZS 6400 for water efficiency labelling rely on information contained in the registration form for energy labelling. An energy labelling registration that has expired or has been cancelled (for any reason) may affect the validity of the relevant water labelling registration. While applications for energy and water labelling share a common registration form, approvals and the continuing validity for each registration are a matter for the relevant regulator.

4.2 HOLDING OF RECORDS

4.2.1 General

Where the registration or approval of energy efficiency labels is not required, Clauses 4.2.2 to 4.2.4 **shall** apply. (Refer also to Appendix C Paragraph C3)

NOTE: At the date of publication of this Standard, the requirements of Clause 4.2.1 are applicable in New Zealand. New Zealand does not operate a registration process but does require submission of information for mandatory listing. Therefore suppliers must ensure that products are either registered in Australia or the form in Appendix C is submitted to the New Zealand regulatory authority. Paragraph C3 lists restrictions regarding submissions to the New Zealand regulatory authority.

4.2.2 Data

Appendix C, Paragraph C4 Sections 1 to 6, give the information that **shall** be recorded and held by the **dishwasher** supplier (manufacturer or importer) to support the performance claims inherently made by the label.

4.2.3 Test report

A test report in the form of Appendix K of AS/NZS 2007.1:2005 **shall** also be held by the **dishwasher** supplier for each labelled model.

4.2.4 Availability

The documents required by this Section **shall** be made available to the relevant regulatory authority upon request. Records **shall** be retained until at least five years after the last date of manufacture or import, whichever is applicable.

4.3 DATE OF MANUFACTURE

The date of manufacture may be non-encrypted, encrypted or able to be determined from a serial number or other markings on the appliance and shall be visible when the appliance is in its position of normal use. Information on how to determine the date of manufacture shall be provided on the registration form (see also Appendix C).

NOTES:

- 1 Regulators will use the date of manufacture as a guide as to when a product may have been available for sale in Australia. It is therefore preferable to be able to determine at least the month and year of manufacture from information on the appliance. This does not however preclude the use of other markings, for example serial numbers, which indicate those appliances manufactured within a period of time, with such details given on the registration form.
- 2 Irrespective of the information marked on the appliance, local manufacturers or importers may be required to provide evidence of the actual manufactured or imported date if requested by a regulator.
- 3 The requirements of this clause are required for the registration of dishwashers for the new water efficiency labelling and Standards scheme under AS/NZS 6400. Refer to Section 4 for transition arrangements.

SECTION 5 PRINTING AND PLACEMENT OF ENERGY EFFICIENCY LABELS

5.1 PLACEMENT

The energy efficiency label **shall** be adhered to the upper front portion of the **dishwasher** or any display front.

The label **shall** be adhered so that it is not obscured when the **dishwasher** or display front is displayed.

5.2 MATERIAL AND SHAPE

The label **shall** be designed as set out in Figure 5.1 and **shall** be self adhesive, except where a finish may be permanently marked or stained by the adherence of a label (e.g. stainless steel), the use of a double-sided swing tag or a single sided non-rotating swing tag is permitted.

The label **shall** be 90 mm wide. A trim or die cut margin of up to 2 mm around the label is acceptable (See notes to Figure 5.1.)

5.3 COLOURS

The label **shall** be printed in the following colours on a white background (See Figure 5.2.)

Red: Pantone Warm Red

Yellow: Pantone 116

Black: Pantone Black

Green: Pantone 340

5.4 ALTERNATIVE WATER CONNECTION MODE DETAILS

Where there is no alternative water connection mode allowed other than the **primary water connection mode**, the **supplementary energy consumption** details are not required on the energy label. In this case no text regarding **supplementary energy consumption** **shall** be included on the label (i.e. this space is left blank).

5.5 LABEL REQUIREMENTS

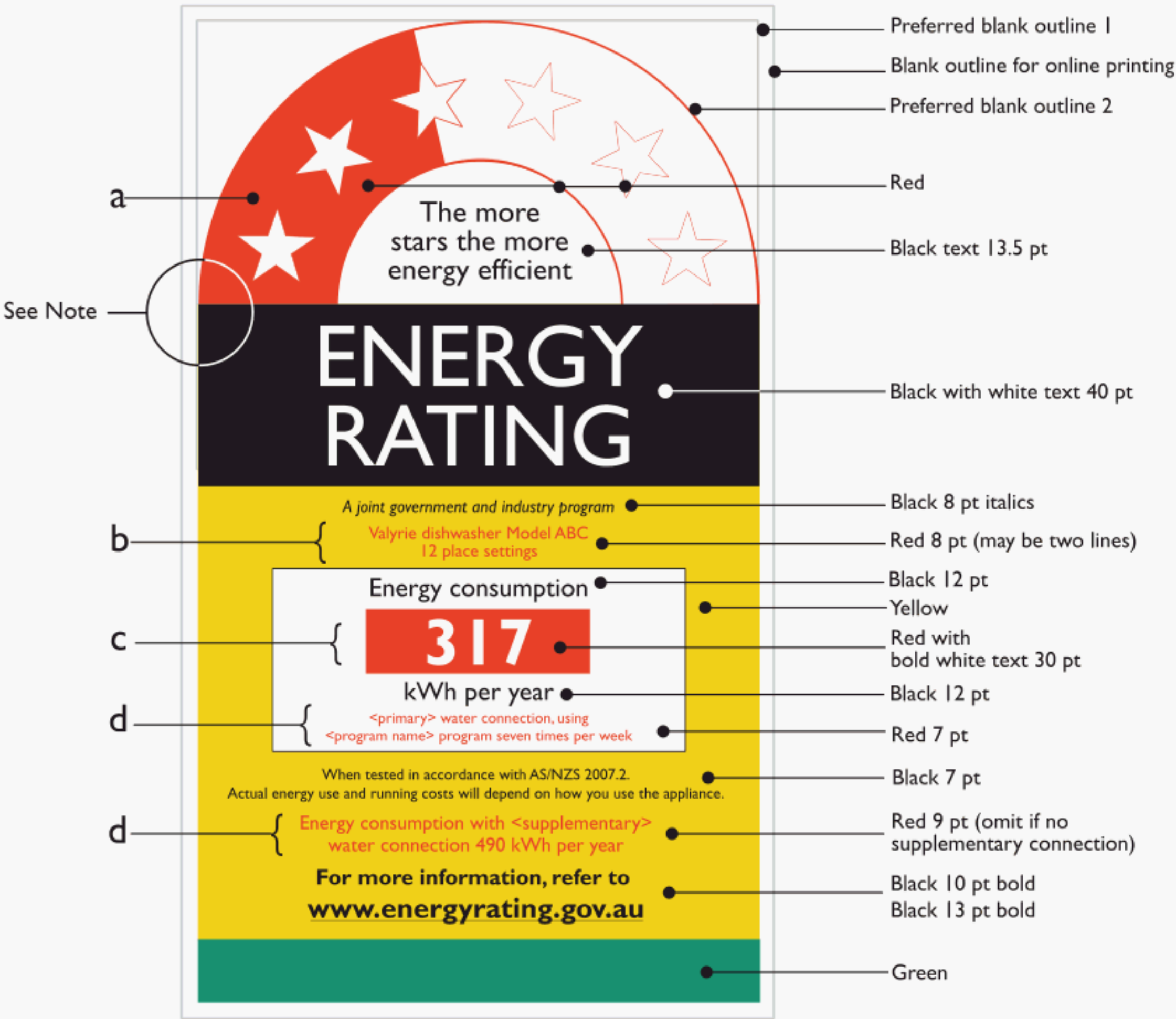
The font used on the label **shall** be Gill Sans, Humanist 521 or Hammersmith. The preferred font is Gill Sans as illustrated in Figure 5.1. Only one font **shall** be used on a label.

The following fields relate to field references in Figure 5.1:

- (a) Field a—This band **shall** terminate according to the **dishwasher's star rating**, either bisecting the relevant star for a rating involving a half star, or, for a rating of only full stars, bisecting the gap between the relevant star and the next highest on the scale. (The 2½ **star rating** shown is an example only.)
- (b) Field b—The brand, model and **rated capacity** **shall** be inserted here. The wording **should** be complete and concise. The lines **shall** not exceed a length of 65 mm. They **should** have normal spacing of letter, line and word. They **shall** be centred horizontally in the area allowed.
- (c) Field c—The panel **shall** contain the **comparative energy consumption**. The figures that apply to the particular **dishwasher** are to be of the font and size indicated and centred in the red panel. The spacing between the figures of a three-figure number is the same as for a four-figure number. (The Figure shown is an example only.)

- (d) Field d—<program name> **shall** be replaced with the name of the **program for energy efficiency labelling** including any associated settings recommended by the manufacturer. <primary> **shall** be replaced with the word ‘cold’ for primary single cold water connection, or ‘hot’ for primary single hot water connection (See Clause 1.5.5.) <supplementary> **shall** be replaced with the words ‘hot and cold, dual’ for supplementary dual water connection, or ‘hot’ for supplementary single hot water connection (See Clause 1.5.13) or **shall** be omitted where no **supplementary water connection mode** is permitted by the manufacturer.

NOTE: All of the information required to produce an energy label using modern printing techniques is contained either in this Section or in Appendix B.

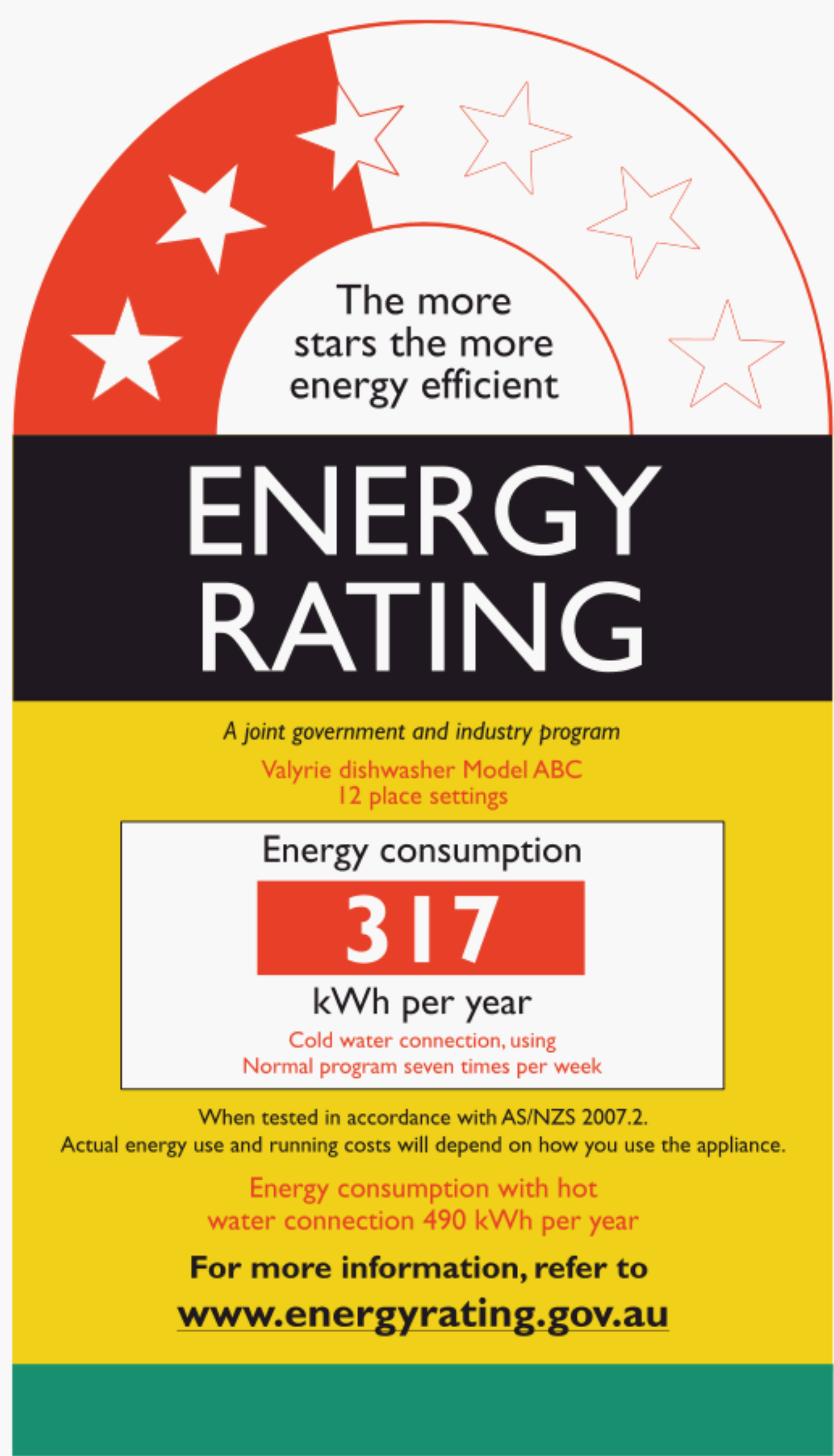


- NOTES:
1. See Clause 5.5 for field descriptions.
 2. An 90 mm star arch width (a) is preferable, however for online printing the arch width can be reduced to a minimum of 86 mm to allow for a ± 2 mm registration error such that the red print does not extend over the edge of the black or result in a white band between the black and red (an overlap is recommended for online printing). (See Appendix B).
 3. See Clause 5.3 for specification of colours. On some printers and display devices, the colours in this sample label may appear different to those specified.

FIGURE 5.1 DETAILS OF LABEL

5.6 SAMPLE LABEL

An example of a printed energy label for a **dishwasher** is shown in Figure 5.2.



- NOTES:
- 1. The brand model, **rated capacity, program for energy efficiency labelling, primary water connection mode, supplementary water connection mode, CEC and supplementary energy consumption** are to be provided.
 - 2. See Clause 5.3 for specification of colours. On some printers and display devices, the colours in this sample label may appear different to those specified.

FIGURE 5.2 EXAMPLE OF LABEL

APPENDIX A

EXAMPLE OF ENERGY EFFICIENCY CALCULATIONS

(Informative)

A1 GENERAL

This Appendix sets out a typical set of test results. It demonstrates the application of the appropriate procedures required to calculate the tested energy performance for each unit and checks for compliance with AS/NZS 2007.1:2005. The **CEC**, **SRI** and **star rating** are also calculated.

A2 RAW DATA

This example sets out the energy efficiency label calculations required for a hypothetical **dishwasher**.

Note that the **primary water connection mode** is single cold connect, unless the manufacturer specifies that only a hot connection is to be used. Where the **dishwasher** has a **supplementary water connection mode**, the **supplementary energy consumption** is also calculated.

A 12 place setting **dishwasher** with a single water connection has been tested in order to prepare information for inclusion on an energy label. The manufacturer allows connection to either hot or cold water. As the unit has only a single water connection mode, cold water connection is the **primary water connection mode** and hot water is the **supplementary water connection mode**. The raw test data for the model is set out in Table A1.

Next, the **PAEC** for each unit is determined using Equation 2(1) which requires values for tested energy consumption (E_t), cycle time and standby power. the standby power measurements for this model are as follows: end of cycle mode = 2.9 W, off mode = 0.4 W while the average cycle time T_c is 1 hour and 18 minutes.

The **PAEC** is given by :

PAEC = $(E_t) \times 365 + [Ps - (8.76 - T_c \times 0.365)]$ (kwh/year)

In this case the **PAEC** is $E_t \times 365 + 13.671$ kWh/year.

The raw test data for the model is set out in Table A1.

TABLE A1

HYPOTHETICAL TEST RESULTS

Unit	Washing index (cold connect)	Drying index (cold connect)	Tested energy consumption (cold connect)	Tested energy consumption (hot connect)
1	0.97	67%	0.882	1.322
2	0.98	65%	0.865	1.356
3	0.96	69%	0.859	1.349

A3 INITIAL CALCULATIONS

The washing index for each of the units is to be assessed against the performance criteria set out in Clause 3.3. The washing index is greater than 0.9 for each unit on the **primary water connection mode** so the model meets this requirement.

The drying index for each of the units is to be assessed against the performance criteria set out in Clause 3.5. The drying index is greater than 50% for each unit on the **primary water connection mode** so the model meets this requirement.

Next, the **PAEC** for each unit is determined using Equation 2(1) for cold water connection. The results are summarized as follows:

Unit	Tested energy consumption (cold connect)	PAEC
1	0.882	335.6
2	0.865	329.40
3	0.859	327.21
Average		330.7

The minimum value of the **CEC** is determined from the average of the 3 **PAEC** values when rounded to the nearest whole kilowatt-hour/year. In this case the minimum **CEC** permissible is 331kWh/year. Note that the manufacturer could elect to use a higher value of **CEC**, but this would also have to be used in all subsequent calculations (i.e. in the calculation of the **SRI** below).

Next, the **supplementary PAEC** for each unit is determined using Equation 2(1) for hot water connection. The results are summarized as follows:

Unit	Tested energy consumption (hot connection)	Supplementary PAEC
1	1.322	496.20
2	1.356	508.61
3	1.349	506.06
Average		503.62

The minimum value of the **supplementary energy consumption** is determined from the average of the three **supplementary PAEC** values when rounded to the nearest whole kilowatt-hour/year. In this case the minimum **supplementary energy consumption** is 504 kWh/year.

A4 STAR RATING INDEX

The **star rating** is determined using Equations 2(2) and 2(3), i.e.

$$\begin{aligned} BEC &= 48 \times RC \\ &= 48 \times 12 \\ &= 576 \\ SRI &= 1 + \left[\frac{\log_e \left(\frac{CEC}{BEC} \right)}{\log_e (1 - 0.30)} \right] \\ &\quad \left[\frac{\log_e \left(\frac{331}{576} \right)}{\log_e (0.70)} \right] \\ &= 1 + \left| \frac{(-0.55398)}{-0.35667} \right| \\ &= 2.5532 \end{aligned}$$

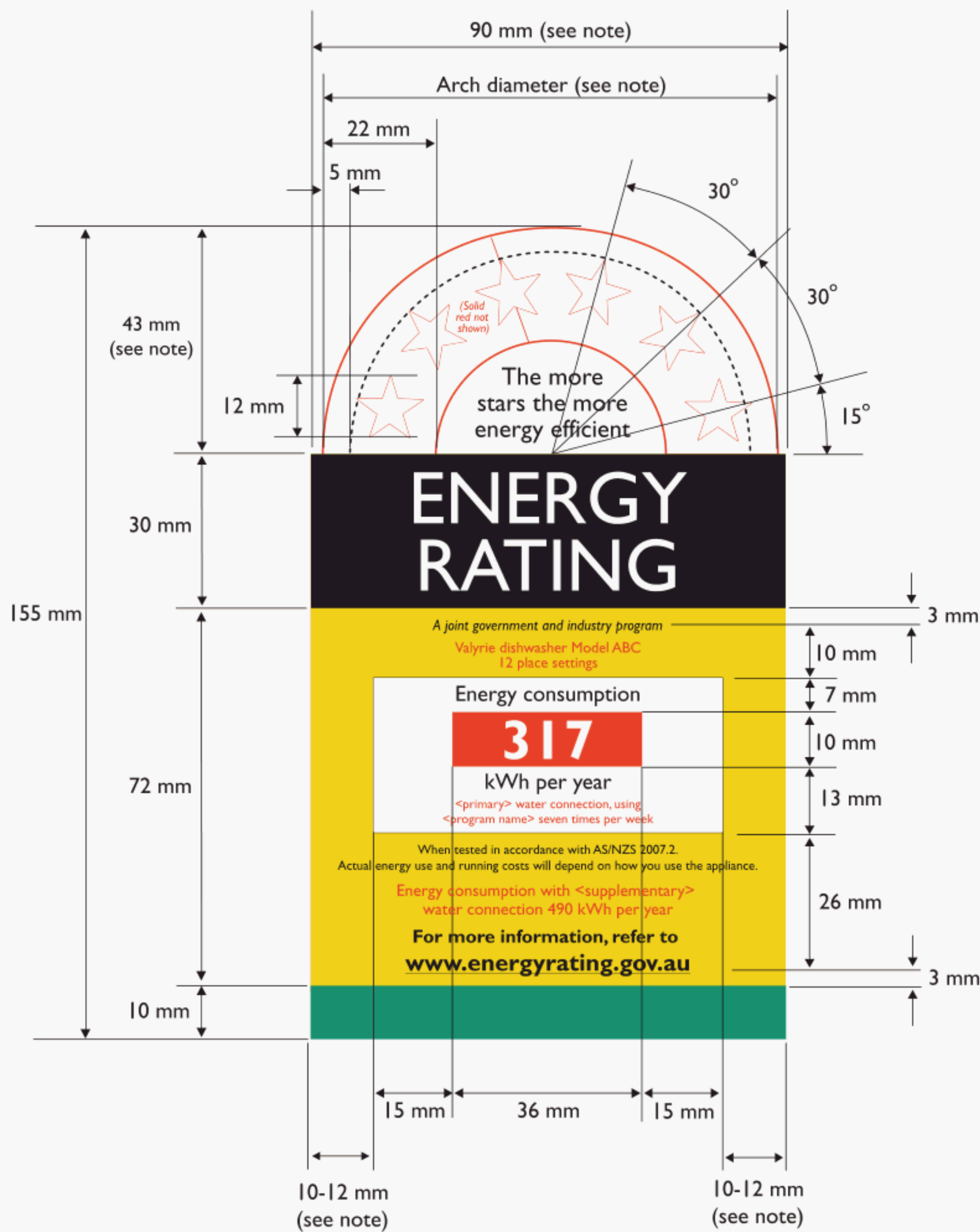
The **star rating** is determined from Table 2.1. In this case, as the **SRI** is greater than or equal to 2.5 but less than 3.0, the **star rating** is 2.5.

APPENDIX B

ENERGY EFFICIENCY LABEL DIMENSIONS

(Informative)

Most of the dimensional information required to create a valid energy efficiency label is given in Figure B1.



NOTE: All dimensions are in millimetres unless shown otherwise. An 90 mm star arch width (a) is preferable, however for online printing the arch width can be reduced to a minimum of 86 mm to allow for a ± 2 mm registration error such that the red print does not extend over the edge of the black or result in a white band between the black and red (an overlap is recommended for online printing).

FIGURE B1 ENERGY EFFICIENCY LABEL DIMENSIONS

APPENDIX C

FORMAT OF APPLICATION FOR REGISTRATION OF A DISHWASHER FOR ENERGY EFFICIENCY LABELLING AND WATER EFFICIENCY LABELLING

(Normative)

C1 INTRODUCTION

This Appendix sets out the required format for submitting an application for registration.

NOTES:

- 1 The contact details supplied by applicants in this form or online may be used by other Government agencies to keep applicants informed of forthcoming regulatory changes that may affect the product registered under this standard. Otherwise, contact details are treated as private and confidential.
- 2 NOTICE OF RIGHT TO DISCLOSE INFORMATION—The information you submit on this application will be used for the purposes of assessing your application and the performance of statutory responsibilities. The information which you have submitted may be disclosed to other state and territory or New Zealand energy efficiency and water efficiency government bodies (or their agents) who may use the information only for the purposes of carrying out their duties and or responsibilities including comparing efficiency claims. The information will also be entered onto the Online Registration Database. More information about this database is available at www.energyrating.gov.au website.

C2 GUIDANCE ON THE USE OF THIS APPLICATION FORM

The preferred method of making an application for energy efficiency labelling and water efficiency labelling is via the online registration system. To use this system, you need to apply for a user name and password. Once a user name has been issued, you will have full access to the online system. Details on how to apply for a user name and password and how to log on to the online system can be found at www.energyrating.gov.au website.

C3 SUBMISSIONS TO THE NEW ZEALAND REGULATOR

Application for listing with the New Zealand regulator can be made online at <http://www.energyrating.gov.au> website.

Applicants who have listed their product with the New Zealand regulator and intend to rely on the goods access provisions of Trans Tasman Mutual Recognition Arrangement to sell that product in Australia without registering it with an Australian regulator shall comply with the following conditions:

- (a) The company responsible for the manufacture or importation of this product **shall** have its registered offices in New Zealand.
- (b) In respect of the product imported or manufactured by the applicant, this product **shall** be either imported into New Zealand (but not directly into Australia) or manufactured in New Zealand (not in Australia).
- (c) If this product is imported into Australia, then it **shall** be imported through New Zealand.

C4 APPLICATION FORM

APPLICATION FOR REGISTRATION OF
A DISHWASHER FOR ENERGY EFFICIENCY LABELLING AND WATER EFFICIENCY
LABELLING

(Please type or print)

SECTION 1 APPLICATION DETAILS

Name of applicant:	
Company name of applicant:	
Company Australian business number:	
Company street address of applicant:	
Company postal address of applicant:	
Contact person: <i>(A name, address and contact details for a person in Australia or New Zealand shall be provided).</i>	Name:
	Address:
	Position/title:
	Telephone:
	Facsimile:
	Email:
	Website:
What is this application for? <i>(Indicate correct answer).</i> <i>Note: The application option of 'water efficiency labelling only' is usually appended to an existing energy labelling registration. In this case, only the additional details required for water labelling are required for the online system. Refer also to Clause 4.1.5.</i>	Energy efficiency labelling only Water efficiency labelling only Both water and energy efficiency labelling
Standard to which this energy efficiency application is being made: <i>Note: Registrations to the 2003 Standard are not valid after 31 March 2007.</i>	AS/NZS 2007.2:2003 – Amendment 1 AS/NZS 2007.2:2005
Standard to which this water efficiency application is being made: <i>Note: The online application form may be amended to include changes required by amendments or revisions to AS/NZS 6400.</i>	AS/NZS 6400
If the applicant is not the manufacturer or importer of the product to be registered you must confirm that you have lodged a letter of authority to make this registration application: <i>(Indicate correct answer).</i>	Confirmed Not confirmed
Is the application for a single model or a family of models? <i>(Indicate correct answer)</i>	SingleFamily

SECTION 2 DESCRIPTION OF DISHWASHER

Brand name:			
Model designation: <i>(List all models covered by this application. This can be either a number or name or combination of the two that will identify the particular product. Add additional rows if more than 3 models).</i>	Model 1:		
	Model 2:		
	Model 3:		
Family model designation, if applicable, for above models:			
Model/family number(s) to appear on the rating label/s: <i>NOTE: Must be one of the above two. This is the model information that will appear on the website.</i>	Each individual model listed above The family designation listed above		
Does this model or family replace or supplement another with the same CEC and SRI for energy and WC and SRI for water? <i>(Indicate correct answer).</i>	YesNo		
If yes, indicate relevant details:	Model name	Model number	Registration number
Country of manufacture:			
In what countries are these models to be sold? <i>(Indicate each country). Note: The response will determine how the model will be displayed on Government energy/water rating websites in Australia and/or New Zealand. If a model is not indicated as being available in a country, that model will not appear on website specific to that country.</i>	Australia New Zealand Others (online users may have access to others)		
Year and month in which model will be/was first available in Australia/New Zealand: <i>Note: The registration will not appear on the energy rating website before that date.</i>	Year	Month	
Date of manufacture information: The date of manufacture information of each appliance shall be able to be determined from information legibly and durably marked on the appliance (refer to Clause 4.3). Applicants must complete one of the three questions below: <i>Note: The requirements of this clause are required for the registration of dishwashers for the new water efficiency labelling and Standards scheme of AS/NZS 6400. Refer to Section 4 for transition arrangement.</i>			
If the date of manufacture is marked in a non-encrypted format, provide a description of the date format clearly identifying which components indicate the day (if included), month and year of manufacture:			
If the date of manufacture is marked in an encrypted format, provide details of how the date of manufacture can be determined so that the decoded information clearly identifies which components indicate the day (if included), month and year of manufacture: <i>NOTE: The date of manufacture encryption method information provided in answer to this question is not intended to be made public.</i>			

<p>Alternatively, provide details of how to determine (from the serial number or other markings for this model) whether the date of manufacturer was either—</p> <p>a) prior to 31 March 2007; or</p> <p>b) on or after 31 March 2007.</p> <p>Notes:</p> <p>1. Only one of the options a) or b) is required.</p> <p>2. The method of determining the date of manufacture information provided in answer to this question is not intended to be made public.</p>	
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SECTION 3 TESTING AND TEST REPORT

Is a test report attached? <i>(Indicate correct answer).</i>	Yes	No
If no test report is attached note the source registration number of the appliance upon which this application relies for its test report: <i>(Proceed to section 4 if no report attached).</i>		
Test laboratory type: <i>(Indicate correct answer).</i>	Own 'in-house' laboratory Independent laboratory	
Test laboratory name:		
Test laboratory address:		
Test laboratory location: <i>(Indicate correct answer).</i>	Australia New Zealand Other - (please specify)	
Test laboratory accreditation:	NATA NATA recognized (please specify) Unknown/none Other – please specify	
Test Standard used: <i>(Indicate correct answer).</i>	AS/NZS 2007.1:2003 (not available after 30 June 2006) AS/NZS 2007.1:2005 Other - (please specify)	
Name of test report signatory:		
Test report number(s) and date(s):	Report number(s): Report date(s):	
Comments regarding the appliance, the test procedure, or test results that should be taken into consideration when assessing the product for compliance: E.g. model name different to intended name.		

SECTION 4 SPECIFIC DISHWASHER DETAILS

Dishwasher dimensions (Advisory only):	Width (mm):	Height (mm):	Depth (mm):
Dishwasher type: <i>(Indicate correct answer).</i>	On bench Freestanding		Built-in Mobile

Name of program and temperature setting (where applicable) used in test (include all associated settings). To be included on the energy label: <i>Note: Operation manual to be supplied to verify program name and settings description.</i>		
All applicants shall confirm that the program nominated above is the one recommended for a normally soiled load equal to the rated capacity in the product literature (i.e. operating manual or user instructions):	Confirmed Not confirmed	
If the above program name is not named 'normal' or one that implies normal such as 'universal' or 'regular' the applicant shall confirm that the appliance has no other program available that is named 'normal' or one that implies 'normal' (Refer Clause 2.2.1).	Confirmed Not confirmed	
Claimed program time (minutes):		
Rated capacity (place settings):		
Load type used for testing: <i>(Indicate correct answer).</i>	AS/NZS or IEC	
Amount of detergent (g):	Prewash:	Main:
Rinse aid dose/setting:		
Water connection type: <i>(Indicate correct answer).</i>	Single / Dual	
Claimed total water consumption (litres to one decimal place):		
Primary water connection mode: <i>(Indicate correct answer).</i> <i>NOTE: Hot connection is only permitted where the manufacturer does not recommend cold connection.</i>	Hot / Cold	
Supplementary water connection mode: <i>(Indicate correct answer).</i>	Hot / Dual / None	
Does the dishwasher have a water softener? <i>(Indicate correct answer).</i>	Yes/No	
If yes, does the dishwasher use water to regenerate the water softener prior to every cycle? <i>(Indicate correct answer).</i>	Yes/No	
Does the product have a power (off) switch?	Yes/No	
Does the product have a delay start feature? <i>Note: Regulators will monitor trends in power consumption in delay start mode and they may take action if the power consumption in delay start mode is excessive.</i>	Yes/No	

SECTION 5 TEST RESULTS

POST PROGRAM TIME AND ENERGY

Post program energy (kWh) (energy from end of program to end of cycle):	
Power consumption (W) in 'end of cycle mode': <i>(Indicate correct answer).</i> <i>(See Clause 2.2).</i>	

If the product has a power switch, report the power consumption (W) in off mode:	
--	--

TEST RESULTS – Primary water connection mode

Serial number	Program/ Cycle time		Cold water volume ($Q_{c\ pr}$)	Hot water volume ($Q_{h\ pr}$)	Total water volume ($Q_{t\ pr}$)	$E_{c\ pr}$	$E_{h\ pr}$	$E_{e\ pr}$	E_t	PAEC
	min		L	L	L	kWh	kWh	kWh	kWh	kWh/ year
Average values										
CEC (kWh/year): (See Clause 2.4).										
BEC (kWh/year): (Calculate using equation 2(2) in Clause 2.5).										
SRI (for energy efficiency): (Calculate using equation 2(3) in Clause 2.6).										
Star rating (for energy efficiency): (See Clause 2.7).										
WC (water consumption in litres/wash to one decimal place): (See AS/NZS 6400).										
BWC (base water consumption in litres/wash): (See AS/NZS 6400).										
Star Rating Index (for water efficiency, not rounded): (See AS/NZS 6400).										
Star rating (for water efficiency, rounded down to nearest half star): (See AS/NZS 6400).										

TEST RESULTS - Supplementary water connection mode

Serial number	Program/ Cycle time		Cold water volume ($Q_{c\ pr}$)	Hot water volume ($Q_{h\ pr}$)	Total water volume ($Q_{t\ pr}$)	$E_{c\ pr}$	$E_{h\ pr}$	$E_{e\ pr}$	E_t	PAEC
	min		L	L	L	kWh	kWh	kWh	kWh	kWh/ year
Mean										
CEC – supplementary (kWh/year): (See Clause 2.4.3)										
WC – supplementary (water consumption in litres/wash):										

WASHING AND DRYING TEST RESULTS – Primary water connection mode

The data in this table shall be provided to regulators on a confidential basis.

Serial number of test machine	Test machine place settings	Test machine total wash score	Reference machine place settings	Reference machine total wash score	Washing index	Total drying score	Drying index	Regeneration fills – test machine wash test	Total operation fills – test machine wash test (excl regen)
Reference machine model and serial number:									

SECTION 6 PERFORMANCE DECLARATIONS

Does each unit tested and the model comply with the requirements of Clause 3.2 for rated capacity? <i>(Indicate correct answer).</i>	Yes/No
Does each unit tested and the model comply with the requirements of Clause 3.3 for washing index? <i>(Indicate correct answer).</i>	Yes/No
Does each unit tested and the model comply with the requirements of Clause 3.4 for water consumption? <i>(Indicate correct answer).</i>	Yes/No
Does each unit tested and the model comply with the requirements of Clause 3.5 for drying index? <i>(Indicate correct answer).</i>	Yes/No
Was the door opened at the end of the drying cycle for the drying performance test? <i>(Indicate correct answer).</i>	Yes/No
If yes, indicate where instructions on door opening for drying were obtained:	

SECTION 7 DECLARATION

I declare that the details stated in this application are correct.

Signature of Applicant: Date:

Office use only:

Date received: Registration number:

NOTES

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NOTES

Standards Australia

Standards Australia is an independent company, limited by guarantee, which prepares and publishes most of the voluntary technical and commercial standards used in Australia. These standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth government, Standards Australia is recognized as Australia's peak national standards body.

Standards New Zealand

The first national Standards organization was created in New Zealand in 1932. The Standards Council of New Zealand is the national authority responsible for the production of Standards. Standards New Zealand is the trading arm of the Standards Council established under the Standards Act 1988.

Australian/New Zealand Standards

Under a Memorandum of Understanding between Standards Australia and Standards New Zealand, Australian/New Zealand Standards are prepared by committees of experts from industry, governments, consumers and other sectors. The requirements or recommendations contained in published Standards are a consensus of the views of representative interests and also take account of comments received from other sources. They reflect the latest scientific and industry experience. Australian/New Zealand Standards are kept under continuous review after publication and are updated regularly to take account of changing technology.

International Involvement

Standards Australia and Standards New Zealand are responsible for ensuring that the Australian and New Zealand viewpoints are considered in the formulation of international Standards and that the latest international experience is incorporated in national and Joint Standards. This role is vital in assisting local industry to compete in international markets. Both organizations are the national members of ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission).

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